

POND SEALING OR LINING – FLEXIBLE MEMBRANE DESIGN AND CHECK DATA REQUIREMENTS

The following items must be addressed in the design folder for lining with a flexible membrane. This can be part of the design folder for the pond design.

The following pages shall be included:

- (1) Table of Contents
- (2) Design Data Summary
- (3) Construction Specifications
- (4) Engineering Drawings
- (5) Erosion and Sediment Control Plan
- (6) Construction Check Data
- (7) Documentation
- (8) O&M Plan

Listed below are specific items that are required in the design:

Table of Contents

Lists key pages found in the design.

Design Data Summary

Important data recorded and consistent with the appropriate standard (e.g. PA378, PA313), including but not limited to:

- PA One-Call documentation
- Testpit locations & logs
- Soils lab data with seepage estimates and liner calculations
- Sealing/liner alternatives considered
- Cost estimates

Construction Specifications

Enclose the applicable construction specification, PA521A-PE/PP or PA521A-EPDM, and others (e.g. 313P, 378, etc.).

Include any “additional conditions” or items that are site specific or must be defined to supplement the standard specification.

(See instructions for use of Specifications 521A.)

Any special or "by-others" specifications (e.g. from liner manufacturer).

Engineering Drawings

TITLE BLOCKS (each sheet)

Operator's name
Type of operation
County
Designer, drafter, checker
Engineer or Record approval (cover sheet only)

COVER SHEET

Site location
Index of drawings
Job Class
Certification Statement
Signature Block
Reference to specific Standard Drawings

PLAN VIEW SHEETS:

North arrow
Utilities, roads, and bench marks
Scale and legend
Access
Existing structures
Cross section locations
Construction limits
Liner limits
Borrow and Spoil areas
Fencing and safety features

SITE CONTOUR SHEET (Preferably same as Plan View Sheet):

North arrow
Bench marks
Scale
Soils test pit location
Existing structures
Contour lines
Property lines
Legend

CROSS-SECTION SHEETS:

Two sections, minimum
 Scale
 Soil test pit profiles
 Structure/pipe configurations
 Anchor trenches
 Access ramp
 Earthfill zones and slopes
 Leak detection systems
 Foundation drainage system
 Reference to detail drawings

DETAIL SHEET(S): Sufficient details to install the liner; e.g. vent locations, penetration locations, required seam locations.

SAFETY:

Utility items
 Excavation safety items
 Pa One Call documentation
 OSHA references as appropriate
 Safety features such as signs, grates, gates, fencing, etc.

CONSTRUCTION SEQUENCE: Detail special order of critical construction elements.

Erosion and Sediment Control Plan

Refer to DEP Erosion and Sediment Pollution Control Program Manual. Include pertinent information in the design.

Construction Check Data**QUALITY ASSURANCE PLAN(QAP)**

Specific items to inspection and when
 Inspector qualifications
 Name of inspector(s)
 Necessary inspection equipment & tests

ONSITE VISITS: The QAP must include, at a minimum, as applicable to the specific job, onsite visits PRIOR to:

- Start of construction
- Completion of foundation excavation to observe and record the foundation conditions encountered

and compare with the conditions assumed in the design.

- Placement of pond liner (and under pad) material to check the subgrade condition
- Completion of seaming and sealing at penetrations.

Visits should also be made during field quality control tests of seams.

Documentation

The following documents need to be assembled and maintained in the office for the life of the facility:

1. A full set of as-built drawings with:
 - a. Items installed as designed; changes shall be recorded in a manner that the As-Built information is obvious, such as in bold and red.
 - b. Notes describing the changes will be recorded on all sheets where changes occurred, including initials.
 - c. Document the actual foundation and ground water conditions encountered if they differ from the site investigation and design assumptions.
 - d. The name of the installer/manufacture and date of completion on the cover sheet.
 - e. The certification statement, signature and date by a person with construction job approval; however a P.E. must certify the completion of all liquid and semi-solid storage facilities.
2. Design Folder.
3. Survey check notes with final elevations shown in red.
4. Material certifications, catalog cuts, etc.
5. Contractor's certification of conformance
6. Photographs, if applicable

7. Records of site visits and significant discussions
8. Other applicable construction records.

Operation & Maintenance Plan

- Precautions to avoid damage to the liner.
- How to inspect the liner for wear, leaks, etc.
- Define procedures for repairing the liner and if included, the soil cover.
- Drawdown restrictions, especially if the liner is covered with soil.
- Explain any monitoring requirements for leak detection systems under waste storage ponds or treatment lagoons.
- Safety precautions, including emergency action plans for containing and controlling discharge from leak detection systems.
- Other special situations, practices, conditions, and requirements for the individual operation.